

Claims

1. Catalyst for the autothermal catalytic reforming of hydrocarbons, which comprises a support body and a multilayer catalyst composition applied thereto, wherein this catalyst composition comprises a lower catalyst layer located directly on the support body and an upper catalyst layer located on the lower catalyst layer and the lower catalyst layer preferentially catalyses the partial oxidation and the upper catalyst layer preferentially catalyses steam reforming.
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2. Catalyst according to Claim 1, wherein the lower catalyst layer contains platinum in a concentration of from 0.1 to 5 % by weight and the upper catalyst layer contains rhodium in a concentration of from 0.1 to 5 % by weight, based on its total weight.
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3. Catalyst according to Claim 1 or 2, wherein the catalyst layers contain noble metals, rare earth metals and base metals of the transition groups as further catalytically active components.
- 15 4. Catalyst according to Claim 3, wherein the catalyst layers each comprise at least one metal of transition group 8 on an oxidic support material selected from the group consisting of aluminium oxide, silicon dioxide, titanium dioxide, boron oxide, bismuth oxide, gallium oxide, oxides of the alkali metals, oxides of the alkaline earth metals, oxides of the transition group elements, rare earth oxides and mixed oxides thereof and zeolites.
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5. Catalyst according to Claim 4, wherein the catalyst composition has been applied to a monolithic support body which has a length L and through which flow channels run from an entry end face to an exit end face and comprises a lower catalyst layer located directly on the support body and an upper catalyst layer located on the lower catalyst layer, with the lower layer having been applied over the total length of the support body and the upper layer having been applied only to part of the support body.
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6. Catalyst according to any of Claims 1 to 4 which contains a further catalyst layer for the carbon monoxide conversion, which is applied as a third layer to the upper catalyst layer.
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7. Catalyst according to Claim 6, wherein the third catalyst layer has been applied to only part of the upper catalyst layer.
8. Catalyst according to Claim 6 or 7, wherein the catalyst layer for the carbon monoxide conversion comprises at least one of the noble metals Pt, Pd, Rh, Ru, Ir, Os and Au as catalytically active component on an oxidic support material selected from the group consisting of aluminium oxide, silicon dioxide, titanium dioxide, rare earth oxides and mixed oxides thereof and zeolites.
9. Catalyst according to Claim 8, wherein the catalyst layer for the carbon monoxide conversion contains at least one rare earth metal and at least one base metal of the transition groups as further catalytically active components.
10. Catalyst according to Claim 9, wherein the catalyst layer for the carbon monoxide conversion comprises platinum and palladium in a concentration of from 0,1 to 5 % by weight in each case, based on its total weight, on a support material selected from the group consisting of aluminium oxide, silicon dioxide, titanium dioxide, rare earth oxides and mixed oxides thereof and zeolites.
11. Catalyst according to Claim 10, wherein the individual catalyst layers additionally contain at least one oxide selected from the group consisting of boron oxide, bismuth oxide, gallium oxide, oxides of the alkali metals, oxides of the alkaline earth metals, oxides of the transition elements and oxides of the rare earth metals in a concentration of up to 70 % by weight, based on the total weight of the catalyst composition.
12. Process for the autothermal, catalytic steam reforming of hydrocarbons by passing a feed mixture of hydrocarbons, oxygen and water or water vapour which has been heated to a preheating temperature over a multilayer catalyst according to any of Claims 1 to 11.
13. Process according to Claim 12, wherein said process is run under adiabatic conditions.
14. Use of the catalyst according to any of Claims 1 to 11 for the autothermal steam reforming of hydrocarbons in reformers for fuel cell systems.

15. Reformer for the catalytic steam reforming of hydrocarbons for hydrogen production which contains the catalyst composition according to any of Claims 1 to 11.